SECTION 2.0
PROJECT DESCRIPTION

This section describes the project location and environmental setting, project objectives, each of the project components, project operations, project design features, and the discretionary actions and approvals required for implementation of the proposed Mission Trails FRS II, Pipeline Tunnel and Vent Demolition Project (proposed project). The project includes all activities necessary for the construction and operation of an up to 18-mg, belowground reservoir, associated pipeline tunnels and staging areas; the demolition of existing vent structures; and the construction of a stabilized crossing of the San Diego River.

2.1 PROJECT LOCATION AND ENVIRONMENTAL SETTING

The project site is located within the northwestern portion of MTRP, just east of the Tierrasanta community, within the City of San Diego (Figure 2-1). State Route 52 (SR-52) is just north of the northern project boundary and Mission Gorge Road forms the southern project boundary. Interstate 15 (I-15) is 2.8 miles to the west. The proposed project is located within Township 15S, Range 2W, on the United States Geological Survey (USGS) 7.5-minute, La Mesa, CA quadrangle topographic map, as shown on Figure 2-2. On-site elevations range from 180 to 820 feet above mean sea level (AMSL) with the lowest elevation at the San Diego River and the highest elevations at the FRS II site, which range from 760 AMSL in the northwest to 820 feet AMSL in the southeast. Along the tunnel alignment, elevations rise and fall as the proposed tunnel passes under canyons and ridges. Elevations range from 550 AMSL in the canyon at the northern end, to a high of approximately 820 feet AMSL at the North Ridge and South Ridge. At the southern end of the proposed tunnel, the ground elevation is approximately 700 feet AMSL. The project study area encompasses approximately 155 acres within MTRP, including areas proposed for new aboveground facilities, and existing developed and undeveloped areas that would be used as staging areas and access roads (Figure 2-3). Truck routes through the Tierrasanta community to SR-52 and I-15 include Clairemont Mesa Boulevard, Portobello Drive, Via Valarta, Antigua Boulevard, and Santo Road. Rueda Drive and Calle de Vida would be used on a limited basis (less than 40 trips per day) for oversized vehicles unable to use the bridge in MTRP at the eastern end of Clairemont Mesa Boulevard.

The project area is in the western portion of the Peninsular Ranges geomorphic province of southern California, which is characterized by northwest trending mountain ranges, valleys, and fault zones. As is all of southern California, the project site is within a seismically active region. Geologic formations consist of Santiago Peak Volcanics at the North Portal area; Mission Valley Formation, Pomerado Conglomerate, and Friars Formation at the FRS II site and along the tunnel alignment; and alluvium at the San Diego River in Mission Gorge. Santiago Peak Volcanics are very hard and typically require blasting to excavate. All other geologic formations that would be encountered consist of cobbles with interbeds of sandstone, siltstone, and claystone. There are no known major or active faults on or in the immediate vicinity of the project site. The Rose Canyon Fault is within 8.3 miles of the project site. While not in the immediate vicinity, it is close enough to be of design consequence, as it would generate the most credible earthquake from a design standpoint. On-site soils consist of gravelly loams, cobbly loams, and riverwash.
The project area is within the San Diego River watershed. With the exception of the stabilized crossing of the San Diego River, substantial groundwater is not anticipated during tunnel or FRS II construction.

The project site is located in the San Diego Air Basin (SDAB). The boundaries of the air basin are coincident with those of San Diego County. The climate of San Diego County is profoundly influenced by the Pacific Ocean and its semi-permanent high pressure systems that result in dry, warm summers and mild, occasionally wet winters. Normal wind patterns include moderate to strong onshore winds during the day and weak offshore winds at night.

The proposed project would be located within urban open space that provides both habitat for native plants and animals and recreational opportunities for residents and visitors to the San Diego area. MTRP, dedicated as parkland in 1974, has become one of the largest urban parks in the United States encompassing nearly 5,800 acres situated only 8 miles northeast of downtown San Diego. MTRP features over 40 miles of trails, boating on Lake Murray, camping at the Kumeyaay Lake Campground, numerous informative hikes, and a state-of-the-art Visitor and Interpretive Center.

MTRP includes lands originally used by the Kumeyaay Indians and features the site of the Old Mission Dam, built to store water for the Mission San Diego de Alcala. The northwest corner of MTRP, where the proposed project would be located, features a series of ridges and valleys covered with Diegan coastal sage scrub and southern mixed chaparral. The San Diego River crosses the Second Aqueduct at the southern end of the project area. This area is dominated by southern willow riparian scrub. All vegetation north of the San Diego River burned in the Cedar Fire in October 2003. Access roads and easements associated with the Water Authority’s existing Second Aqueduct and San Diego Gas & Electric (SDG&E) high voltage power lines traverse this corner of the park, as does a network of hiking/biking/equestrian trails.

The Mission Trials Regional Park Master Plan, which was adopted in 1985, identifies five major geographical areas of the park. The project site is located within West Fortuna Mountain area, with the stabilized crossing of the San Diego River within the Mission Gorge area. In 1997, the City of San Diego adopted the Multiple Species Conservation Program (MSCP) Subarea Plan, which includes the project site and all of MTRP in the Eastern Area Multi-Habitat Planning Area (MHPA), as part of the hard line preserve for biological purposes. Portions of the park are developed with active and passive recreational uses, with large areas retained as undeveloped open spaces. Surrounding land uses include residential development to the west in Tierrasanta and to the south in San Carlos and Navajo, the Marine Corps Air Station Miramar to the north (on the north side of SR-52), and the East Fortuna Mountain portion of MTRP to the east.

2.2 PROJECT OBJECTIVES

The proposed project, which would increase the Water Authority’s ability to transport raw water to water treatment plants south of MTRP, is necessary to meet increased demands for untreated water in the south county area. Specifically, the City of San Diego and the Sweetwater Authority are currently undertaking several water treatment plant expansion projects to meet public demands and the Water Authority must increase delivery capabilities to match the increased
water treatment capabilities. The City of San Diego anticipates completion of the Miramar and Alvarado water treatment plant expansions by 2009 and the Otay Water Treatment Plant by 2030. The Sweetwater Authority plans to complete expansion of the Perdue Water Treatment plant by 2030.

The primary objective of the proposed project is to provide additional regulatory storage and improved flow control and capacity for raw water in response to future increased demands from water treatment plants in the south county area. Hydraulic modeling of the Water Authority’s raw water system has identified a bottleneck in the flow through MTRP where Pipelines 3 and 4 cross Fortuna Ridge. This bottleneck restricts flows from Miramar Hill in the north and, without the proposed project, would prevent the Water Authority from meeting near-future demands of the water treatment plants to the south. The proposed project would eliminate this bottleneck through the construction of a single, approximately 13-foot-diameter tunnel within which an up to 96-inch-diameter steel pipeline would be installed. The pipeline tunnel would replace parallel sections of Pipelines 3 and 4, which are the two raw water pipelines that traverse MTRP. The pipeline tunnel would also lower the hydraulic grade line to provide increased flow through MTRP. The proposed pipeline tunnel would connect to the proposed FRS II, which would provide up to 18 mg in storage capacity for times when member agencies reject flow, and would provide stored water to continue deliveries when there is an interruption in flow from the north. In other words, the proposed project would increase flow capacity and would allow the Water Authority to better regulate the flow of raw water through MTRP.

A secondary project objective is protection of the aqueduct system from an anticipated higher frequency of service interruptions once the Second Aqueduct pipelines to the north are converted from a gravity flow system to a partially pumped system. This conversion will occur at the completion of the San Vicente Tunnel and Pump Station project and the Rancho Penasquitos Pressure Control/Hydroelectric Facility project, currently scheduled for 2008. The post-project flow capacity of the raw water pipelines would be 686 cubic feet per second (cfs) south of the Miramar Vent and 353 cfs south of the Miramar Water Treatment Plant.

Other project objectives are to reduce the visual impacts of Water Authority structures within MTRP through the removal of existing vent structures and to stabilize an existing road crossing of the San Diego River adjacent to the Water Authority’s right-of-way in Mission Gorge.

The specific project objectives are to:

- Eliminate hydraulic bottlenecks in Pipelines 3 and 4 for untreated water.
- Increase the water deliveries to water treatment plants under expansion.
- Improve pipeline operations by reducing spills.
- Provide short-term operational storage to meet unplanned outages.
- Remove most of the vents across MTRP; and,
- Stabilize existing crossing of San Diego River and improve surface of existing dirt roads to improve Water Authority, Park Ranger, Fire, Police, and Emergency vehicular access
to MTRP, from south of the San Diego River to north of the San Diego River, to facilitate inspections and maintenance.

### 2.3 PROJECT COMPONENTS

The proposed project consists of two major components: the FRS II, and large-diameter inlet and outlet pipelines installed within tunnels. In addition, many of the vents within the affected reach of Pipelines 3 and 4 would be removed or replaced with much smaller air release/vacuum valves, as would several blow-off valve structures, which are grouped as “appurtenances.” Finally, the project includes the construction of a stabilized crossing of the San Diego River to facilitate operations and maintenance, including improved access for emergency pipeline repairs. Locations of these project components are shown on a recent aerial photo of the project area (Figure 2-4). Additional areas of disturbance, such as tunnel portals, staging areas, and access roads, are discussed in Section 2.4, Project Construction.

#### 2.3.1 Flow Regulatory Structure

The proposed FRS II would consist of an up to 18-mg buried reservoir, an aboveground control building, and appurtenant facilities. Site grading layout for the FRS II facility is shown on Figure 2-5. The FRS II would be constructed on a 12.78-acre parcel known as the Elliott 4 Parcel (APN 371-010-1500), which is currently owned by the San Diego Unified School District (SDUSD). With the elimination of the Jackson Drive Extension from the City of San Diego Circulation Element in the early 1990s, the parcel is no longer considered viable for a school site. The site is located approximately 400 feet northeast of the existing FRS I site and was considered in 1993 as an alternative location for the FRS I. The rectangular parcel measures approximately 655 feet by 850 feet and is located just east of the Water Authority’s 130-foot-wide Second Aqueduct easement. Ground elevations range from 760 feet AMSL in the northwest to 820 feet AMSL in the southeast.

**Buried Reservoir**

The buried reservoir would consist of a concrete structure measuring up to 296 feet by 392 feet, with an overall height of up to 28 feet from floor to roof, depending on the slope of the floor and roof. All of the reservoir would be buried (Figure 2-5). Inside the structure would be two basins, up to 9-mg each, which would allow one basin to be taken out of service for maintenance while the other basin remains in service. Each basin would contain an overflow structure at elevation 792 feet AMSL to prevent accidental filling to a point that the basins would pressurize. The overflow structure would be designed for the full design flow into the structure. Such emergency overflow would be conveyed by a pipeline to the canyon on the north side of the buried reservoir. An energy dissipater would be constructed at the end of the pipeline to prevent erosion of the canyon in the event of an emergency overflow situation. The pipeline outlet and energy dissipater would be located within the Water Authority’s existing 130-foot-wide Second Aqueduct easement. A 2-foot-thick layer of soil, vegetated with a native plant mix, would be placed on top of the buried reservoir structure following construction.
**Access/Control Building**

An aboveground access/control building associated with the buried reservoir would house the control room and access room. The access/control building would be located at the south edge of the buried reservoir. The building would measure approximately 20 feet by 50 feet, and would be a maximum of 10 feet high. The entire structure would be surrounded by an 8-foot-high security fence, which would be accessed by workers through a gate. A vegetated, earthen berm would be placed around the building to partially screen public views by residents to the west and park users. Figure 2-6 presents a computer simulation of the proposed access/control building.

The control room is the main room of the building. It would serve as the primary entrance to the building and contain the Supervisory Control and Data Acquisition (SCADA) equipment and other control equipment. The access room would be located adjacent to the control room and would be the only personnel entrance to the reservoir basins. A stairway from this room would lead into each reservoir basin for maintenance and access for testing. Equipment hatches in the roof would be used for placing equipment in the basins and removing material. The separate valve vaults would house the large valves that would isolate the basins from water entering and leaving the basins.

Electric and communication utilities are available in the residential area immediately west of MTRP along Corte Playa Catalina. SBC/Pac Bell provides telephone service to the existing FRS I facility. It is anticipated that a similar service would be sufficient for the proposed FRS II facility. Both SDG&E and SBC have confirmed that there is sufficient capacity in their systems to serve the proposed FRS II site. New conduit would be required along the Second Aqueduct right-of-way from Corte Playa Catalina to the FRS II site. The distance would be approximately 1,400 feet to the FRS II site for both conduits. The conduits would be buried and located within the existing Second Aqueduct right-of-way.

Exterior lights would be provided at all aboveground structures. All exterior lights would be shielded to prevent glare and exposure to the nearby residents and would only be used when workers were present. Routine inspections and maintenance would be conducted during daylight hours. Workers would only be present at the structure after dark in the event of an emergency.

Landscape planting would be limited to a native seed mix designed to grow with no irrigation once it is established. Areas that would be planted include cut and fill slopes and all other areas disturbed by construction of the FRS II components. The intent of the revegetation would be to prevent erosion and visually blend all improved areas with the surrounding natural vegetation following construction.

**FRS II On-Site Piping**

The inlet piping bringing water into the reservoir from the north would consist of a buried welded steel pipe up to 96 inches in diameter that would branch into two 72-inch-diameter steel pipes. At the maximum flow rate of 353 cfs, the velocity in a 96-inch-diameter pipeline would be 7.0 feet per second (fps). The 72-inch-diameter pipes would enter the FRS II reservoir
through the inlet valve vault. The outlet piping would exit the structure to the south in two 72-inch-diameter steel pipes. All pipelines would be mortar lined and plastic-tape wrapped and mortar coated. The overflow pipe could be a concrete pipe or a welded steel pipe with a plastic-tape wrap and cement mortar coating. Since this pipeline is not anticipated to be used except in an emergency, it also would be epoxy lined to prevent potential damage to cement mortar lining that is caused by the mortar drying in an empty pipe.

### 2.3.2 Pipeline Tunnels

The proposed new pipelines would replace approximately 5,000 feet of existing Pipelines 3 and 4 in MTRP with a single 96-inch-diameter welded steel pipeline. The vertical alignment of the new inlet and outlet pipelines in the tunnels would be designed without localized high or low points. This means that instead of following the contours of the West Fortuna Mountain area of MTRP with its series of five ridges and valleys, the inlet pipeline tunnel would follow a continuous grade from the North Portal up to the FRS II inlet shaft, and the outlet pipeline tunnel would follow a continuous grade from the FRS II outlet shaft down to the South Portal. The elimination of the ups and downs of the existing Pipelines 3 and 4 would increase the flow capacity of the alignment, as would the increased pipe diameter. The pipeline tunnels would require vents at the inlet and outlet connection shafts adjacent to the FRS II. Existing blow-offs would be used at the portals/tie-ins. The alignment and profile of the inlet tunnel and outlet are shown on Figure 2-7. The total length of tunnel for the proposed project would be approximately 4,800 feet. The difference in length between the pipeline tunnel and the abandoned existing pipeline would consist of trenched pipelines at the North and South Portals that would connect the new pipeline tunnel to the existing pipelines.

The pipelines would be placed in tunnels that would be constructed belowground, except at the North and South Portals and the inlet and outlet shafts adjacent to the FRS II. The tunnel portals are the locations where construction equipment and excavated material would enter and exit the tunnel. The inlet and outlet shafts are the locations where the pipeline tunnel would connect to the FRS II via on-site piping. The tunnel portals would be located just east of the Water Authority easement, on City of San Diego property. The inlet shaft would be located within the footprint for the FRS II, on the property that would be purchased from SDUSD. The outlet shaft would be located outside the school district property, on land owned by the City of San Diego. The vent structures and blow-off structures are within the Water Authority Second Aqueduct easement.

The excavated tunnels are proposed to be approximately 13 feet in diameter. The two tunnel segments would be constructed from the North and South Portals, moving toward the FRS II inlet and outlet shafts. The North Portal would be located just west of the Second Aqueduct easement near the Portobelo Drive access point. The South Portal would be located just west of the Second Aqueduct easement between Elliott Vents #4 and #5.

The North Portal construction staging area would impact an area of approximately 4.5 acres, extending from the portal site to the intersection of an existing dirt road with the Portobelo Drive entrance. The South Portal construction staging area would impact an area of approximately 1.3 acres extending from Elliott Vent #4 to the pipeline connection point near Elliott Vent #5. The
permanent portal footprints would each consist of a 6-foot-diameter lid on an accessway to the buried insulating flange, if an insulating flange is required, at each pipeline connection point.

The inlet and outlet tunnels would terminate at the FRS II reservoir in 12-foot-diameter vertical tunnel shafts constructed near the reservoir. The construction area for the inlet (northern) shaft would be within the SDUSD property. The construction area for the outlet (southern) shaft would be outside of the SDUSD property, and would encompass an area measuring approximately 150 feet wide by 200 feet long. Permanent shaft footprints would consist of 25-foot by 25-foot concrete pads on the ground surface to be an access point for the 12-foot by 12-foot belowground vault extending to the pipeline tunnel. The shafts would lead to permanent 20-foot deep vaults above the pipeline tunnels.

The tunnels would be designed as pressure tunnels and would require watertight linings that would be installed after excavation. The support system for the tunnel lining could consist of the following types of lining methods:

- **Rock reinforcement**: resin, cement grouted, and friction rock bolts coupled with surface treatment of shotcrete or other materials to stabilize poor quality closely jointed rock. Effective for supporting tunnel in Santiago Peak Volcanics excavated using drill and blast method. Santiago Peak Volcanics are found at the North Portal and are anticipated for the first 200 to 1,000 feet of tunnel. The drill and blast method of excavation consists of the drilling of holes into the solid rock and the use of explosives to fracture the rock. The rock pieces are then excavated using standard low-profile excavators and loaders designed for use within tunnels.

- **Steel ribs**: wide flange beams bolted at plate connections to form a complete rib in a horseshoe or circular shape; lagging consisting of timber, steel channels, shotcrete, and liner plates can be installed in between adjacent ribs. Effective for supporting tunnel in Mission Valley Formation and Pomerado Conglomerate excavated by a roadheader or a roadheader with a shield, and in Santiago Peak Volcanics excavated by drill and blast method. Shield excavation involves the use of a steel liner to prevent tunnel collapse during excavation with standard excavation equipment while a roadheader is like a giant drill bit that cuts through the earth. The roadheader that would be used for the proposed project would be electrically powered from a trailing electric cable. Power would be supplied by diesel generators located at the tunnel portal staging areas or from a power drop from SDG&E.

- **Shotcrete**: concrete sprayed onto the rock surface through a hose and nozzle. Effective for supporting tunnels in Mission Valley Formation and Pomerado Conglomerate excavated by a shield or roadheader, and in Santiago Peak Volcanics excavated by drill and blast method.

- **Liner plate**: Thin, rectangular curved steel plates installed in a circular ring and bolted together, with the annular space between the plates and the tunnel walls filled with cement grout. Effective for sedimentary formations excavated using a shield.

### 2.3.3 Vent Removal

The proposed project would allow most or all of the existing highly visible vent structures in MTRP to be removed or replaced with a less visually obtrusive structure. Some vents would be replaced with an air release/vacuum structure. The planned action for each vent is as follows:

- Elliot Vents #1, #2, and #3 on Pipelines 3 and 4 would be removed.
- Elliot Vent #4 on Pipelines 3 and 4 would be removed. This pair of vents would be replaced with air release/vacuum structures per Water Authority Standard Drawing SD-3. The air release/vacuum structures would be concrete boxes or cylinders up to 10 feet square and extending up to 3 feet above the ground surface.
- Elliot Vent #5 on Pipeline 3 would stay at its present location or may be replaced with an air release/vacuum structure.
- Elliot Vent #5 on Pipeline 4 would be removed and replaced with an air release/vacuum structure.

### 2.3.4 San Diego River Crossing

The proposed project would include construction of a stabilized crossing of the San Diego River at the location of an existing unimproved gravel road crossing. The stabilized crossing would facilitate site access for future operations, maintenance, and security patrol. The proposed stabilized crossing would be located upstream of Pipelines 3 and 4, outside of the Water Authority’s right-of-way. Water Authority operations and maintenance personnel drive the Second Aqueduct access road on a daily basis to inspect facilities and perform routine maintenance. Increased maintenance activities for the FRS II and pipeline tunnel would require enhanced access to the site. Water flows in the San Diego River currently force Water Authority personnel, park rangers, and emergency vehicles to make a lengthy detour to access Mission Gorge Road from the park when the water is more than 12 to 18 inches deep, depending on the condition of the riverbed and banks. The crossing needs to be stabilized so that small trucks can cross the river during normal flows. The river would remain impassable during winter storm events and subsequent periods of high flow. The crossing would consist of a concrete slab at grade with the existing riverbed (Figures 2-8 and 2-9).

### 2.4 PROJECT CONSTRUCTION

#### 2.4.1 General Schedule

A composite schedule of construction activity for the FRS II, pipeline tunnels, and appurtenances is presented in Table 2-1. This table shows the expected duration of each major construction activity. Overall, construction is expected to last approximately 2 years, with the level of
### Table 2-1

**Proposed Construction Schedule**

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intensity varying from high for the first 6 months during tunnel mobilization and FRS II excavation; to moderate for the 18 months during tunnel excavation, pipeline installation and FRS II construction; to low at the end of the project during vent demolition and pipeline connections. The general working time would be 7:00 a.m. to 7:00 p.m., Monday through Saturday. Construction at the South Portal would be 24 hours per day, 7 days per week for the duration of the project. Construction at the North Portal would be limited to 7:00 a.m. to 7:00 p.m., Monday through Saturday, with the exception of two, 10-day pipeline connection periods, one at the beginning of the project and one at the end, during which construction would be 24 hours per day.

### 2.4.2 Staging Areas

General staging for the proposed project would occur at the Clairemont Mesa Boulevard MTRP entrance, west of the bridge. Construction trailers and other support facilities not required at the portal or FRS II sites would be located in this staging area. Parking for crew/engineering vehicles would be allotted in this space as well, to minimize individual vehicles on park trails being used for hauling. It is anticipated that the entire Clairemont Mesa Boulevard park entrance area would be used for staging for the entire duration of construction. The location of the project staging areas is shown on Figure 2-4. The acreage for each staging area is shown on Table 2-2.

<table>
<thead>
<tr>
<th>Location</th>
<th>Area (acres)</th>
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<tbody>
<tr>
<td>Clairemont Mesa Boulevard</td>
<td>2.4</td>
</tr>
<tr>
<td>North Portal</td>
<td>4.5</td>
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<tr>
<td>FRS II Site Inlet Shaft</td>
<td>0.8</td>
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<tr>
<td>FRS II Site</td>
<td>12.78</td>
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<tr>
<td>FRS II Site Outlet Shaft</td>
<td>0.8</td>
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<tr>
<td>South Portal</td>
<td>1.3</td>
</tr>
<tr>
<td>Vent Demolition Sites</td>
<td>0.25 each</td>
</tr>
<tr>
<td>Blow-off Demolition Sites</td>
<td>0.25 each</td>
</tr>
<tr>
<td>San Diego River Crossing</td>
<td>1.0</td>
</tr>
</tbody>
</table>

A staging area would be graded on the FRS II site for stockpiling of excavated soil, pipe, and other equipment and materials. The staging area on the FRS II site would be cleared and graded in accordance with environmental requirements to stockpile top soil. The site would then be fine graded to a level surface to provide 0.5 to 1.0 percent grade for site drainage. It is not anticipated that the contractor would pave the site. Erosion control measures would be required in accordance with the Stormwater Pollution Prevention Plan (SWPPP). At the conclusion of construction, the contractor would restore the site to the final topography shown in the construction documents. Completed topography would ultimately depend on the location of access roads. Areas temporarily disturbed on the FRS II site would be planted with native vegetation.
Staging areas would be similarly graded at each of the portal sites, and restored at the end of construction. Staging areas for the portals are shown on Figure 2-4. Vent demolition and blowoff abandonment activities would require staging areas approximately 150 feet by 150 feet around these points, all of which can be reached by existing park roads or the Water Authority easement. These areas would be restored to similar topography and planted with native vegetation at the end of construction.

### 2.4.3 Access Routes

Following an extensive study of road widths, slopes, and other considerations, the following routes to/from I-15 and SR-52 have been proposed for construction equipment and hauling of excavated material via trucks (see Figure 2-10):

- **North Portal Construction Activities Ingress/Egress -** east/west on Clairemont Mesa Boulevard from I-15, or east/west on Antigua Boulevard from Santo Road and SR-52, to Via Valarta and Portobelo Drive. From Portobelo Drive to North Portal via MTRP access point at Belsera.

- **South Portal and FRS II Construction Activities Ingress/Egress -** east/west on Clairemont Mesa Boulevard to MTRP access point at the end of the street, over the park bridge to South Portal and FRS II sites via existing MTRP roads.

An exception to the proposed access ingress and egress pattern is that equipment heavier than 60,000 pounds (30 tons) would not be brought into the construction areas in MTRP via the park bridge, because the posted weight limit on the bridge is 30 tons. Large equipment, such as track-type tractors, track loaders, excavators, dozers, scraper, cranes, and end dump trucks, would be brought into and out of the MTRP South Portal and FRS II sites via the Calle de Vida MTRP access point, following Calle de Vida and Rueda Drive to/from Clairemont Mesa Boulevard. This type of equipment would generally come into the sites for the duration of their use in construction, and then be removed. Such heavy equipment would not be entering and leaving the sites on a frequent basis.

The Clairemont Mesa Boulevard entrance and bridge and the Portobelo Drive access road used for construction ingress and egress and associated activities would be closed to MTRP patrons during project construction. This is because tunnel construction would be possible 24 hours per day, 7 days per week, for months at a time and public safety must be maintained. The Calle de Vida entrance to MTRP would remain open during project construction with access restricted only while trucks and equipment are present. All park entrance points, roads, and trails would be reopened at the earliest date possible, without compromising the safety of park patrons or project workers.

With one exception, the park roads used for construction ingress and egress would be widened to 12 feet, if currently less than 12 feet wide. One approximately 2,000-foot-long section of access road from Clairemont Mesa Boulevard, between the SDG&E tower and FRS II site, would be widened to 20 feet to allow for two-way truck traffic. This section of road would be returned to a 12-foot width following construction. All access roads would also be re-graded for use as...
needed during construction. Crushed rock or gravel would be placed on the park access roads to minimize erosion damage and stabilize the surface for heavy trucks.

2.4.4 FRS II Construction

Construction of the FRS II would require the clearing and grubbing of the project site and the excavation of up to 105,000 cubic yards (cy) of rock and soil (muck). The excavated muck would be hauled off site in dump trucks with anticipated capacities of 10 cy (10-wheel dump trucks) or 15 cy (18-wheel dump trucks). Ten-wheel dump trucks with trailers could also be used. The excavation of up to 105,000 cy of muck would require up to 10,500 truck trips using 10 cy dump trucks for muck disposal. Use of 15 cy dump trucks would reduce the maximum number of truck trips to 7,000 trips. Peak traffic periods may reach 240 trips per day, with all trucks using the Clairemont Mesa Boulevard access for ingress and egress. Excavation would take approximately 5 months and would be followed by the construction of the concrete FRS II, the construction of an aboveground access and control building, the backfilling and covering of the FRS II, and the revegetation of the project site. The basic construction sequence for the FRS II is expected to be as follows:

- Staging area construction, access road modifications, and equipment/supply mobilization
- Brushing, clearing and grubbing on site
- Excavation of first 40 feet of depth
- Excavation of final 10 feet of depth
- Subgrade backfill and laying underdrains and vaults
- Bottom slab concrete forming and pouring
- Columns, walls and roof forming and concrete pouring
- Backfill FRS structure
- Electrical lines trenching, wiring installation, and connection to supply
- Site piping trenching and installation
- Valve vault construction
- Access/control building construction
- Final site grading and revegetation
- Start-up and testing
- Demobilization

Heavy equipment to accomplish grading would be brought on site and would remain on site for the duration of construction. This type of equipment could include Caterpillar D9 and D11R track-type tractors, Caterpillar 973C track loaders, and Caterpillar 325C L and 330C L excavators.

Preliminary geotechnical investigations indicate the lower reaches of the reservoir excavation may have cemented sandstone requiring rock hammers and blasting. The contractor’s actual equipment used for excavation may ultimately dictate whether blasting is needed. A description of a typical blasting operation is provided below under the discussion of pipeline tunnel construction.
2.4.5 Pipeline Tunnel Construction

Construction of the pipeline tunnels would require the clearing and grubbing of the North and South Portals, excavation of up to 48,060 cy from approximately 4,825 feet of tunnel, installation of pipe sections within the tunnels, connection of the completed tunnel pipelines to the FRS II and the existing aqueducts, and restoration of the tunnel portals. The excavation of up to 48,060 cy of muck would require up to 4,806 truck trips using 10 cy dump trucks for muck disposal. Use of 15 cy dump trucks would reduce the maximum number of truck trips to 3,204 trips. All trips are round trips with empty trucks entering MTRP and loaded trucks leaving MTRP. Muck truck traffic through the Portobelo Drive access is anticipated to vary from 4 to 8 dump trucks per day over a period of 14 months. Muck truck traffic through the Clairemont Mesa Boulevard access is anticipated to vary from 23 to 38 dump trucks per day over a period of 5 months. Construction of the tunnels and installation of the pipeline would take approximately 20 months.

The basic construction sequence for the pipeline tunnel is expected to be as follows:

- Staging area construction, access road modifications, and equipment/supply mobilization
- North Portal construction and preparation for tunnel excavation
- South Portal construction and preparation for tunnel excavation
- Shaft construction for FRS II connections
- North tunnel excavation
- South tunnel excavation
- Final tunnel lining installation
- Pipeline installation
- FRS II and existing pipeline connections
- Demobilization from shafts and site restoration
- Demobilization from portals and site restoration

Portal/shaft construction is expected to generate the greatest number of truck trips during tunnel construction. The type of equipment brought on site would include heavy lift crane, down hole track rig, surface loader, down hole excavator, off-road fork lift, generator, compressor, cable saw, and miscellaneous tools.

The two tunnels would be constructed from opposite directions: from the North Portal southward to the shaft on the inlet side of the FRS II, and from the South Portal northward to the shaft on the outlet side of the FRS II. Each tunnel reach through the Mission Valley Formation and the Pomerado Conglomerate is expected to be constructed with roadheader type of tunneling equipment. Roadheaders are mining machines used mainly for excavation of tunnels in weak to moderately strong rock. If combined with a shield, the shield would be advanced forward by pushing off an initial support system. An average advance rate of 10 linear feet (lf) of tunnel per single 8-hour shift each day is estimated for the first 1,000 feet of the inlet tunnel where the drill and blast technique is required. The average advance rate for the remainder of the tunnel would be 18 lf per single 8-hour shift each day using a roadheader for excavation. The Outlet Tunnel, from the South Portal, would be constructed using three shifts per day (24/7) with an average daily advance rate of 34 lf.
Large tunnels can also be constructed with a Tunnel Boring Machine (TBM), which is a self-propelled, fully automated machine capable of excavating, loading, and installing the initial tunnel support system in one continuous operation. Based on the limited length of the two tunnel headings, the relatively high cost of tunnel boring machines, and the horizontal and vertical geometry of the alignment, this tunnel construction method is not considered likely. The construction technique, however, would be up to the contractor.

At the north end of the project area, the first 200 to 1,000 feet of inlet tunnel excavation would occur in Santiago Peak Volcanics, which are strong to extremely strong igneous rocks. Drill and blast excavation would be required at the North Portal for this initial reach. This type of construction generally consists of four steps: 1) drilling a pattern of holes in the tunnel face and loading the holes with explosives, 2) blasting the round and ventilating the blasting gases, 3) mucking (removing) the blasted rock, and 4) installing initial ground support as needed. To minimize additional disturbance beyond the intended excavation lines, controlled, smooth wall blasting techniques would be used with low charge weights per delay. Advance rates are estimated at 10 feet per 8-hour shift for drill and blast and 18 feet per 8-hour shift for excavation with a roadheader. Two months have been anticipated in the construction schedule for this initial reach through hard rock from the North Portal. Blasting could occur between 7:00 a.m. and 7:00 p.m., Monday through Saturday. Seismic monitoring, blast mats, sequential blasting, and direction optimization would be conducted to minimize vibration, fly rock and air blast. Blasting permits would be obtained from the City of San Diego Fire Department.

As the tunnel is excavated, the excavated muck would be removed. Muck cars, a horizontal continuous conveyor belt, or belowground trackless Load-Haul-Dump (LHD) are typical muck removal methods. The choice of muck removal methods would be based primarily on excavation sequence, contractor preference, and equipment availability. The excavated material would be hauled off site in dump trucks.

Groundwater inflow into the tunnel may occur through permeable layers within the sedimentary rock. The tunnel is expected to be constructed above the groundwater table, but perched groundwater may be encountered. In this case, the tunnel face would be immediately supported until the water has drained to the tunnel portals. The groundwater would be treated prior to discharge to existing drainage channels in MTRP using settling ponds, tanks, portable filtration plants, pH adjustment, or a combination of systems, in accordance with discharge permits that would be obtained from the San Diego Regional Water Quality Control Board. Water from the North Portal would be directed into Shepherd Canyon and water from the South Portal would be directed into the canyon to the west.

Pipe sections would be installed once the inlet and outlet tunnels are constructed. Pipe would be installed in a maximum of 50-foot lengths through the portals. The size of trucks available to carry the pipe segments and the size of the crane available to lift the pipe segments into the portals would affect the segment length.
2.4.6 Pipeline Connections

Following the construction of the FRS II and pipeline tunnels and successful pressure testing of the new pipeline in the tunnels, the new pipelines would be connected to the existing Pipelines 3 and 4. This work would require the two existing water supply pipelines to be shut down. The work would include shutting down and draining the pipelines, constructing the connection, filling the pipelines, conducting any necessary abandonment, and placing the combined pipeline system back on-line. All work would have to be completed within 10 days (7 days for construction activity by the contractor and 3 days for draining and filling the pipeline). This 10-day period must fall within a 60-day period during the winter months when water demand south of the project site is at its lowest for the year. This is because the water treatment plants south of MTRP have a limited storage capacity for raw water and would run out after a shutdown much longer than 10 days. Simultaneous shutdown of both Pipelines 3 and 4 would be required. To minimize shutdown time, both connections (at the north and the south) would be completed at the same time. The pipeline connection work would require 24-hour/day operations at both tunnel portals for up to 10 consecutive days.

Construction work for the tie-in points would occur in the following sequence:

- Excavate existing pipelines and prepare trench shoring
- Isolate and dewater existing pipeline section (by Water Authority staff), dewater new pipe section, and remove test bulkhead
- Take out existing pipe sections designated to be demolished
- Clean and prepare existing connection joint
- Fit new pipe sections
- Weld pipe joints
- Mortar line pipe joints
- Inspect the connection
- Encase the connection in concrete
- Replace blind flanges at access points
- Construct concrete thrust blocks
- Backfill and compact excavated sections
- Place pipeline back in service

Abandoned sections of the pipelines that remain in place would be encased with sand or concrete. The length of section that would be abandoned for each pipe is approximately 5,000 feet.

In order to utilize the new Mission Trails Pipeline Tunnel and FRS II most effectively, it may be necessary to re-configure the flows in the pipelines leading into the Mission Trails project area. This project component is referred to as the Pipeline Interconnect Reconfiguration. At present, Pipelines 3, 4, and 4B enter the area from the SR-52 right-of-way; Pipeline 3 carries untreated water, Pipeline 4 is out-of-service, and Pipeline 4B carries treated water. Pipeline reconfiguration could include the reactivation of Pipeline 4, which is currently out of service, to carry either untreated or treated water, thereby increasing flow capacity. It is also possible that Pipeline 3 could be switched to carry treated water, and Pipeline 4B switched to carry the
untreated water flows. These reconfigurations would require the construction of one or two “crossovers” to reconnect the pipes in the optimum configuration. This would occur in the general vicinity of the existing “Shepherd Canyon Wye” facility and San Diego 11 service connection, at the north end of the project area (See Figure 2-4). Access would be from Portobelo Drive.

The probable construction for these crossovers, if needed, would involve excavation for pipeline construction, which could take a few weeks to a few months for total completion. Although the overall construction period could last several months, the shutdown period for the crossover connections would only take approximately 10 days and would be simultaneous with the connection of the tunnel pipelines. During the shutdown period, work at the site would be 24 hours per day, 7 days per week. The surface would be restored to existing conditions following the construction in this area.

2.4.7 Vent and Blowoff Removal

A construction zone of 150 feet by 150 feet, centered on each pair of vents and at each blowoff location, would be disturbed by the removal of these appurtenances. The aboveground portion of the vents would be removed with a crane and hauled off site. The top of the buried portion of the steel vertical shafts would be dug up with an excavator, cut off approximately 3 feet below the ground surface, and hauled off site. The remaining belowground portions of the vent structures would be filled with concrete to prevent groundwater from entering the abandoned portion of the pipeline. The excavation would be filled with soil, and the site would be restored with a native seed mix. Some vents would be replaced with an air release/vacuum structure, as noted in Section 2.3.3.

The construction sequence at the blowoff structures would be similar. The equipment from these structures (valves, flanges, hatches, etc.) would be removed and salvaged, the pre-cast concrete portion of structures would be removed and disposed, and the manway would be capped with concrete to prevent groundwater from entering the pipe. The sites would be restored with a native seed mix.

2.4.8 Spoil Disposal

Topsoil and other soil needed for backfilling would be temporarily stockpiled on site. Excess materials would be hauled off site for use as fill at other construction sites or as cover material at a local landfill. The final disposal location for the excavated muck would be selected by the contractor. The contractor would be expected to select the most efficient disposal site, meaning the site at which the materials could be unloaded would result in the quickest round trip for haul trucks and the lowest disposal cost. Use of the spoils within MTRP would be the most efficient disposal method. Park Rangers from the City’s Park and Recreation Department have expressed a need for clean fill in the park and would be given first priority for receipt of the material. This would benefit the park through the provision of free material for erosion control and other fill needs, and would benefit the Water Authority through reduced disposal costs. Finally, in-park disposal would reduce the number of truck trips on surrounding streets necessary for disposal of the spoils.
There are also several off-site disposal options for the contractor. If spoils are relatively free from foreign materials, sand and gravel processors and fill brokers may be interested in the materials. Nearby potential locations are shown on Figure 2-11 and include Canyon Rock and Asphalt rock quarry on Mission Gorge Road adjacent to the south side of MTRP. Quarry operators would be interested in muck that has less than 20 percent fines from the Pomerado Conglomerate and the Santiago Peak Volcanics. Vulcan Materials Mission Valley Quarry located in Mission Valley would also be interested in some of the muck. Hansen Aggregates Miramar Recycle Site, located west of I-15, is interested in Pomerado Conglomerate, and unsorted tunnel muck may be accepted at their site for fill. Hansen Aggregates Carroll Canyon Plant, located on Miramar Road, may accept Santiago Peak Volcanics. Sycamore Canyon Landfill, north of SR-52, would accept muck for daily cover if it is not wet or contaminated.

### 2.4.9 San Diego River Crossing Construction

The construction of a stabilized at-grade crossing of the San Diego River would require a construction zone approximately 50 feet wide by 100 feet long. This construction zone would include the existing unimproved road crossing in the river channel as well as additional area for a temporary cofferdam to divert flow during construction and for excavation at the channel bed to create a stable bottom condition and anchor the stabilization material. The area permanently disturbed would be a 15-foot-wide and 70-foot-long stabilized crossing area.

### 2.5 PROJECT OPERATION

#### 2.5.1 FRS II Operation and Maintenance Procedures

Water flow into the FRS II buried reservoir would be controlled by the Water Authority Operations Center and is dependent on the total flow ordered from Lake Skinner and the water delivered to the member agencies north of the FRS II site. Normal water elevation in the FRS II structure would be maintained at approximately 780 feet AMSL. Flows rejected by member agency flow control facilities upstream of the FRS II would gradually fill the reservoir basins. Water deliveries that are greater than the member agencies’ orders downstream of the FRS II would gradually empty the FRS II reservoir basins. The outlet valves would be for isolation of flow only.

The following maintenance activities are anticipated at the new FRS II facility:

- Visiting and inspecting the site approximately once per day to monitor daily operations and security at the site. This routine access would be accomplished with ¾-ton trucks.
- Maintaining the valves periodically at the valve vaults. The valve crew would access the site with 2-ton valve maintenance trucks. Frequency may vary from weekly to monthly.
- Cleaning the bottom of the basins to remove silt, clam and mussel shells, and other debris every 2-5 years. The basins would be drained individually into the water supply system and crews would access the basins through the access building. Equipment and debris
would be removed through the access hatches in the roof of the reservoir with a small crane.

- Responding to outages or other emergency situations as needed.

### 2.5.2 Pipeline Tunnel Operation and Maintenance Procedures

Based on the Regional Water Facilities Master Plan PEIR (2003), the following operations are generally associated with operation and maintenance of pipelines:

- Weekly visual inspection of pipeline alignments;
- Grading/repair of access roads as needed;
- Testing and servicing of blowoff valves, air release/vacuum valve assemblies as needed;
- Yearly walking of pipeline alignment and inspection of cathodic protection system; and
- Pressure testing pipeline, painting pipeline appurtenances, repairing tunnel entrances, and repairing minor leaks in buried pipeline joints or segments when necessary.

### 2.6 GENERAL CONDITIONS / STANDARD SPECIFICATIONS AND PROJECT DESIGN FEATURES

The Water Authority’s *General Conditions and Standard Specifications* 2005 Edition will be provided to the selected contractors for this project. In addition, project-specific design features, which could minimize or avoid environmental impacts, will be implemented. These contract specifications and design features have been grouped by issue area. Note that they are not exhaustive, and that other construction specifications or design features could be developed that are as effective as those listed. Standard construction specifications and design features will be incorporated into the project as appropriate to avoid significant impacts. Additional detail regarding standard construction specifications can be found in the appropriate sections of the Water Authority’s *General Conditions and Standard Specifications*.

#### 2.6.1 Aesthetics/Visual Quality

**Standard Specifications**

*General Conditions and Standard Specifications* Section 02940 - Revegetation (3.13): The establishment maintenance period will begin on the first day following completion and acceptance of the revegetation work. Continue the establishment maintenance activities for a period of two years following the date of the filing of the Notice of Completion (i.e., the contract warranty period), and as specified herein.

**Project Design Features**

The proposed project has been designed to be almost entirely belowground. All disturbed areas will be graded following construction to be compatible with the surrounding topography. Excess
soil will be disposed of and the sites will be cleared of all construction debris. All areas disturbed by construction, not proposed for permanent roads or facilities, will then be revegetated with a native seed mix.

Building colors will be of neutral color and design elements will be incorporated to complement the surrounding natural open space. Building design will feature free-form curved walls. Building will be recessed into earthen berm.

Permanent lighting will be limited to use by Water Authority employees making repairs or conducting maintenance. Typically, no lights will be visible at night from the proposed facilities.

2.6.2 Traffic/Circulation

Standard Specifications

*General Conditions and Standard Specifications* Section 02200 - Earthwork (3.16): Haul excavated materials from the work site to approved disposal location(s) during the hours permitted in accordance with local traffic control regulations. Provide traffic control as required by the agency having jurisdiction.

Project Design Features

Prior to construction, the contractor will prepare the detailed Traffic Control Plan for review by the Water Authority and approval by the City of San Diego. The plan will be prepared in accordance with the latest edition of the Federal Highway Administration Manual of Uniform Traffic Control Devices, as modified by the most recent California Supplement.

Hours of operation for trucks associated with the project grading and construction, including hauling of excess materials out of MTRP and construction materials into MTRP, will be restricted to 7:00 a.m. to 7:00 p.m., Monday through Saturday.

Truck traffic on Rueda Drive and Calle de Vida will be limited to oversized trucks and equipment and will not exceed 40 trips/day. All other construction traffic will utilize the Clairemont Mesa Boulevard, Portobelo Drive or Mission Gorge Road (stabilized crossing of the San Diego River only) access points to MTRP.

2.6.3 Air Quality

Standard Specifications

*General Conditions and Standard Specifications* Section 01560 - Temporary Controls (1.03): Perform continuous dust abatement measures in accordance with the San Diego Air Pollution Control District’s regulations to prevent construction from producing dust in amounts harmful to persons or animals or causing a nuisance to persons or animals living nearby or occupying buildings in the vicinity of the work. Use water or dust prevention to control dust.
General Conditions and Standard Specifications Section 01560 - Temporary Controls (1.05): Keep all public and private roads used for ingress and egress in a clean and neat condition. Take measures, as necessary, to prevent the tracking or accumulation of materials on roads. Sweep or wash all loose materials and mud from equipment before entering the road. Provide street sweeping services when requested by the Engineer.

General Conditions and Standard Specifications Section 01560 - Temporary Controls (1.10): Comply with all applicable federal, state, county, and city laws and regulations concerning the prevention and control of air pollution. Perform construction activities and operate equipment in a manner which will minimize atmospheric emissions or discharges of air contaminants. Do not operate equipment or vehicles that show excessive emissions of exhaust gases on the site.

General Conditions and Standard Specifications Section 02200 - Earthwork (3.01): Prevent dust from damaging crops, orchards, cultivated fields, and dwellings, or causing a nuisance to persons. Dust control measures shall be in effect for the duration of the project.

General Conditions and Standard Specifications Section 02310 - Tunneling (3.05): Use blasting mats as necessary to prevent flying rock during tunnel excavation near the portal(s).

Project Design Features

All clearing and grading will be carried out with dust control measures adequate to prevent creation of a nuisance to persons or public or private property. Clearing, grading, and construction plans will require that measures such as the following be undertaken to achieve this result: watering, application of surfactants, shrouding, control of vehicle speeds, or other technological measures to reduce dispersion of dust. Specific source control Best Management Practices (BMPs) identified in the project design could include, but not be limited to, the following:

- Multiple applications of water during grading between dozer/scraper passes.
- Chemical stabilization of internal roadways after completion of grading.
- Use of sweepers or water trucks to remove “track-out” at any point of public street access.
- Termination of grading if winds exceed 25 mph.
- Stabilization of dirt storage piles by chemical binders, tarps, fencing or other erosion control.

There are no permanent air quality impacts associated with the proposed project.

2.6.4 Noise and Vibration

Standard Specifications

General Conditions and Standard Specifications Section 01560 - Temporary Controls (1.11): Comply with all local sound control and noise level rules, regulations, and ordinances which apply to any work performed pursuant to the Contract. Equip each internal combustion engine
used for any purpose on the job or related to the job with a muffler of a type recommended by the manufacturer. Do not operate internal combustion engines on the project without said muffler. Noise level requirements shall apply to all equipment on the job or related to the job, including but not limited to trucks and transient equipment that may or may not be owned by the Contractor. Avoid the use of loud sound signals in favor of light warnings except where required by safety laws for the protection of personnel.

Please refer to Public Safety/Hazards section for additional information regarding noise and vibration associated with blasting.

**Project Design Features**

Grading and construction activities will be limited to the hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday, with the exception of 24/7 tunneling activities at the South Portal and the 10-day pipeline connection phase of the project at the North Portal, South Portal, and Pipeline Interconnect Reconfiguration. Temporary noise barriers will be provided between stationary equipment and the closest sensitive receptors at the North Portal and the Pipeline Interconnect Reconfiguration area north of the North Portal.

**2.6.5 Recreation**

**Standard Specifications**

There are no general conditions or standard specifications applicable to recreation.

**Project Design Features**

Roads and trails within MTRP that are within the area affected by the proposed project will be closed for the duration of construction to avoid potential conflicts between construction activities and recreational activities. All road and trail closures will be well marked and alternative routes will be identified. All roads and trails within the area affected by the proposed project will be restored to existing conditions, or better, following construction. Nearly all of the project features will be belowground. The surface of the park will be revegetated with a native seed mix and returned to natural open space available for passive recreation. Most of the existing Elliott Vents #1 - #5 will be removed and replaced with smaller facilities.

**2.6.6 Hydrology/Water Quality**

**Standard Specifications**

*General Conditions and Standard Specifications* Section 02140 - Dewatering (1.04): Comply with Regional Water Quality Control Board Waste Discharge requirements under Orders 96-41 and 95-25. Obtain authorization, as required, prior to discharge of groundwater, and comply with the sampling, testing, monitoring, and reporting requirements specified therein.
General Conditions and Standard Specifications Section 02140 - Dewatering (3.01): Dispose of water in such a manner as to cause no injury or nuisance to public or private property, or be a menace to the public health. Dispose of the water in accordance with applicable regulatory agency requirements. Prevent disposal of sediments from the soils to adjacent lands or waterways by employing necessary methods, including settling basins. Locate settling basins away from watercourses to prevent silt-bearing water from reaching the watercourse during flow regime. Where excavations may obstruct the natural flow of a watercourse, implement measures to control and dispose of the surface water that will not adversely affect water quality or beneficial uses of the watercourse. Divert watercourse flows around excavation areas by constructing barriers, temporary culverts, new channels or other appropriate means. Do not allow water containing mud, silt or other pollutants from aggregate washing or other construction activities to enter a watercourse or be placed in locations that may be subjected to high storm flows.

General Conditions and Standard Specifications Section 02270 - Temporary Erosion Control (1.01): For projects with soil disturbances of one acre or more, comply with the National Pollution Discharge Elimination System General Permit for Storm Water Discharges Associated with Construction Activity, General Permit No. CAS000002 and requirements included herein.

General Conditions and Standard Specifications Section 02270 - Temporary Erosion Control (3.01): Grade disturbed surfaces to provide positive drainage and prevent ponding of water. Surface water shall be controlled to prevent water damage or deposition of sediment to all adjoining and downstream properties. Install silt fences, sedimentation ponds, sandbag dikes, stabilized construction entrances and any other erosion control measure to minimize sediment escape from the construction site and to maintain runoff quality in compliance with the General Permit. Prevent construction sediment from entering any streams, ponds or drainage facilities. Erosion and sedimentation control measures shall remain in place until such time that the site of work is prepared for permanent drainage and erosion control measures. Remove temporary erosion and sediment control measures so as not to interfere with permanent drainage, erosion control and revegetation.

General Conditions and Standard Specifications Section 02940 - Revegetation (3.05): Continuously control erosion as specified herein and in accordance with measures shown on the Plans or the SWPPP. Erosion control measures shall be implemented and maintained throughout the warranty period.

Project Design Features

Prior to the start of ground disturbing activities, the Water Authority will prepare a SWPPP to reduce or eliminate pollutants during and after construction is complete. The plan will identify all pollutant sources, including sources of sediment that may affect the quality of storm water discharges associated with construction activity (storm water discharges from the construction site); identify non-storm water discharges; identify structural and/or treatment control BMPs that are to be implemented in accordance with a time schedule to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction; and develop a maintenance schedule for permanent or post-construction...
BMPs that will “to the maximum extent possible” reduce or eliminate pollutants after construction is completed.

Detailed BMPs to prevent hazardous materials impacts to water quality will be included in the project SWPPP. Standard industry measures include, but are not limited to the following:

- Storage of a minimal amount of hazardous materials on site and restriction of storage/use locations to areas at least 50 feet from storm drains and watercourses.
- Use of covered and/or enclosed facilities for all hazardous materials storage.
- Maintenance of accurate written inventories and labels for all stored hazardous materials.
- Use of berms, ditches and/or impervious liners (or other applicable methods) in material storage and vehicle/equipment maintenance areas to provide a containment volume of 1.5 times the volume of stored/used materials to prevent discharge in the event of a spill.
- On-site storage of absorbent and clean-up materials where they are readily accessible.
- Proper location and maintenance of trash and wastewater facilities.
- Posting of regulatory agency telephone numbers and a summary guide of clean-up procedures in a conspicuous location at or near the job site trailer.
- Regular (at least weekly) monitoring and maintenance of hazardous material use/storage facilities and operations to ensure proper working order.
- Implementation of a Storm Water Sampling and Analysis Strategy (SWSAS) program pursuant to regulatory guidelines.

The grading/construction contractor will conform to applicable NPDES General Groundwater Extraction and Waste Discharge Permit criteria prior to disposal of extracted groundwater. While specific BMPs to address potential water quality concerns from disposal of extracted groundwater will be determined based on site-specific parameters, they will likely include the following types of standard industry measures derived from the NPDES Permit text and applicable agency/industry sources:

- Use of erosion prevention and sediment control devices for applicable conditions (e.g., when extracted groundwater is discharged onto graded or unstabilized areas).
- Testing, filtering (e.g., with gravel and filter fabric media) and/or treating (e.g., by conveyance to a municipal wastewater treatment plant) of extracted groundwater prior to discharge, if required for NPDES permit conformance.
- Removal of groundwater for treatment and disposal by a licensed operator, if required for NPDES permit conformance.
2.6.7 Biological Resources

**Standard Specifications**

*General Conditions and Standard Specifications* Section 02110 - Clearing and Grubbing (3.02): Conduct clearing and grubbing operations in a manner that will preserve and protect vegetation beyond the limits of clearing and grubbing. No filling, excavating, trenching or stockpiling of materials shall be permitted within the drip line of the protected vegetation. The drip line is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of the vegetation. To prevent soil compaction within the drip line area, no equipment will be permitted within this area. Prior to the start of clearing and grubbing, schedule and attend a site observation visit with the Engineer to verify existing conditions and the location of environmentally sensitive areas. Erect protective fencing or environmental flagging around environmentally sensitive areas and along the rights-of-way as shown on the Plans and as directed by the Engineer during the site observation visit. Maintain fencing and flagging in good condition for the duration of the work.

*General Conditions and Standard Specifications* Section 02940 - Revegetation (3.05): Monitor for erosion within revegetation areas and provide measures to prevent gullies, rill and sheet erosion, and silt deposition from occurring. Erosion control shall emphasize prevention. Repair erosion as required and include redirection or dissipation of the water source and contouring of soil, followed by seeding, mulching, or planting. Strategically placed and secured straw wattles, hay bales or sandbags may be used to dissipate water sources. Do not use invasive exotic species for erosion control.

**Project Design Features**

Native vegetation disturbance will be limited to the construction zones as indicated by flagging.

Equipment staging and refueling areas will be located away from sensitive habitat and natural drainages.

Prior to the commencement of construction, the limits of grading will be clearly delineated by a survey crew prior to brushing, clearing, or grading. The biological monitor will check the grading limits before initiation of construction grading. The contractor(s) will be responsible to mitigate impacts to sensitive biological resources beyond those identified in this report or any subsequent reports that occur as a result of construction activities.

Activities will be prohibited within drainages (other than those that may occur within an approved construction zone), including staging areas, equipment access, and disposal or temporary placement of excess fill.

Construction in or adjacent to sensitive areas or potentially affecting sensitive species will be appropriately scheduled to avoid sensitive and/or breeding seasons and to minimize potential impacts to biological resources.
Erosion and siltation into off site areas during construction will be minimized. The contractor will prepare an erosion control plan. The construction supervisor will be responsible for ensuring that the erosion control plan is developed and implemented.

Appropriate post-construction fencing and signage will be installed to prohibit access and avoid potential impacts to sensitive resources adjacent to the site.

Lighting will be directed away from any native habitat and will consist of low-sodium or similar lighting equipped with shields to focus light downward on the appropriate subject.

If staging areas outside the construction footprint are used, they will be surveyed for biological resources prior to use.

During clearing, grading, earth moving, excavation, or transportation of cut or fill materials, water trucks or sprinkler systems will be used when necessary to prevent dust from leaving the site.

During construction, water trucks or sprinkler systems will be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this will include wetting down such areas in the morning and after work is completed for the day.

A tunnel has been proposed for construction of approximately 5,000 feet of pipeline beneath MTRP to minimize surface disturbance in the park. The FRS II has been designed to be belowground. An existing staging area, constructed for the FRS I project, has been selected for the proposed project. Existing roads within MTRP have been selected for ingress and egress to the construction sites. Impacts have been limited to the Water Authority’s existing right-of-way wherever possible. An existing crossing of the San Diego River has been selected for the proposed stabilized crossing. Impacts (both temporary and permanent) to Diegan coastal sage scrub within the Water Authority’s right-of-way have been previously mitigated at the Crestridge Habitat Management Area.

The removal of vegetation from MTRP will be limited to the non-breeding season for nesting migratory birds (September 15 through March 15). Such a restriction will also avoid direct impacts to birds afforded the federal species of concern and/or the California species of special concern status. If it would not be possible to limit clearing of vegetation to only during the non-breeding season, nesting surveys will be conducted prior to the removal of vegetation, active nest areas will be avoided, and a 500-foot buffer will be maintained around the nest, until the young birds have fledged. If removal of mature trees is proposed during the raptor breeding season, a survey for active raptor nests will be conducted, and similar measures will be followed if active nests are found.
2.6.8 Geology and Soils

Standard Specifications

General Conditions and Standard Specifications Section 02270 - Temporary Erosion Control: This section will be used as standard specifications to minimize soil erosion for construction projects.

Project Design Features

The project will include design features to minimize or avoid general geology and soils impacts. These features could include, but are not limited to, the following:

- Project plans will be reviewed to ensure compatibility with geotechnical conclusions.
- Applicable field activities (e.g. manufactured slope conditions, excavations and fill placement) will be reviewed and appropriately modified by the geotechnical engineer.
- Project design and construction elements, including seismic loading, excavation and grading, fill parameters (e.g., composition and moisture content), foundations and footings, manufactured slopes, and pipelines, will be in conformance with appropriate regulatory guidelines and industry standards.

Project construction activities will comply with existing regulatory requirements related to geology and soils, including applicable elements of the NPDES General Construction Permit, such as implementing a SWPPP and associated sedimentation BMPs. Typical control measures that may be implemented as part of the project SWPPP include:

- Preparation and implementation of a “weather triggered” action plan during the rainy season to provide enhanced erosion of sediment control measures prior to predicted storm events (i.e., 40 percent or greater chance of rain).
- Use of erosion control/stabilizing measures in appropriate areas (including disturbed areas and graded slopes with grades of 3:1 [horizontal to vertical] or steeper), such as geotextiles, mats, fiber rolls, soil binders, or temporary hydroseeding established prior to October 1.
- Use of sediment controls to protect the site perimeter and prevent off-site sediment transport, including measures such as filtration devises (e.g., temporary inlet filters), silt fences, fiber rolls, gravel bags, temporary sediment basins, check dams, street sweeping, energy dissipators, stabilizing construction access points, (e.g., with temporary graveling or pavement) and sediment stockpiles (e.g., with silt fences and tarps), and use of properly fitted covers for sediment transport vehicles.
- Storage of BMP materials in applicable on-site areas to provide “standby” capacity adequate to provide complete protection of exposed areas and prevent off-site sediment transport.
- Provision of training for the personnel responsible for BMP installation and maintenance.
- Solid waste management efforts such as proper containment and disposal of construction debris.
- Installation of permanent native vegetation as soon as feasible after grading or construction.
- Implementation of appropriate monitoring and maintenance efforts (e.g., prior to and after storm events) to ensure proper BMP function and efficiency.
- Implementation of sampling/analysis, monitoring/reporting and post-construction management programs per NPDES requirements.
- Implementation of additional BMPs as necessary (and required by appropriate regulatory agencies) to ensure adequate erosion and sediment control.

Actual BMPs for the proposed project will be determined during the NPDES permitting and SWPPP process, with such measures taking priority over the typical industry standard measures listed above.

The project will include design features to minimize or avoid instability of manufactured slopes and retaining walls. These features could include, but are not limited to, the following:

- Field observation/mapping of manufactured slopes by the project geotechnical engineer, and (if applicable) implementation of site-specific design/construction changes.
- Provision of adequate drainage for all manufactured slopes and retaining walls, including surface features to prevent runoff on slopes and subdrains, if appropriate, to prevent saturation of surficial materials (including retaining wall backfills).
- Use of maximum grades of 2:1 for fill slopes and 1.5:1 for cut slopes.
- Use of approved fill materials and application methodologies (e.g., compaction and moisture content) for fill slopes.
- Over-filling of fill slopes by approximately six feet horizontally, with slopes then trimmed back to expose the compacted inner core after the fill is brought to finish grade (or compaction with a sheepsfoot roller or equivalent devise for fill slopes either less than 10 feet high, located over cut or existing slopes, or that cannot be overfilled).
- Use of native and/or drought-tolerant landscaping to reduce irrigation requirements (and/or use of subdrains as noted above).
- Use of stabilizing techniques (e.g., rock bolts) in applicable cut slopes.
- Incorporating appropriate placement of slopes and retaining walls (i.e., away from potential saturation sources) and drainage facilities, as well as use of applicable criteria for lateral earth, surcharge and seismic pressures in the design of all retaining walls.
- Evaluation of soil/rock conditions encountered during excavation to determine appropriate slope inclinations and stabilizing measures (e.g., shoring) to conform with existing U.S. Occupational Safety and Health Administration (OSHA) and California Occupational Safety and Health Administration (CAL/OSHA) requirements (including 29 CFR Part 1926, Occupational Health Standards-Excavations).
The project will include design features to minimize or avoid differential compression or settlement of on-site soils. These features could include, but are not limited to, the following:

- Site-specific settlement analyses will be conducted in areas deemed appropriate by the project geotechnical engineer.
- Depending on the results of the individual analyses, the project geotechnical engineer may require additional measures including overexcavation of unsuitable materials and replacement with engineered fill, locating foundations and larger utility pipelines outside of cut/fill transition zones, and limited irrigation of landscaped areas.
- Expansive materials will be removed, mixed with non-expansive soils and/or placed in deeper fills (at least five feet below finished grade) during grading.
- Oversized material used in fills will not exhibit maximum dimensions greater than four feet, and will not be placed within 10 feet of finish grade, 10 feet of manufactured slope faces (measured horizontally from the slope face) or 3 feet of the deepest pipeline or other utilities. Oversize material (i.e., rock with maximum dimensions greater than 12 inches) will be managed via off-site disposal, use in non-structural fill, or crushing or pre-blasting to generate material with maximum dimensions of less than 12 inches.

Project development will conform to applicable industry standards (e.g., the UBC and/or Greenbook) regarding corrosive soils. A site-specific investigation of potential corrosion hazards will be conducted in areas deemed appropriate by a qualified corrosion engineer for the proposed project. The results of this analysis will be checked against the final project design, as appropriate, to address potential corrosion impacts, and may include, but not be limited to, measures such as:

- Excavation (or overexcavation) and treatment, and/or removal and replacement (i.e., with engineered fill) of corrosive materials.
- Use of non-corrosive and/or corrosion-resistant building materials in appropriate locations and installation of cathodic protection.

2.6.9 Public Safety and Hazardous Materials

**Standard Specifications**

*General Conditions and Standard Specifications* General Conditions (GC) Section 5.2: The Contractor is responsible for maintaining an orderly project site and providing jobsite security, and to that end shall employ such watchmen or other persons and implement other appropriate security as may be required.

*General Conditions and Standard Specifications* GC Section 5.3: The Contractor shall prohibit the use or possession of intoxicating liquors or controlled substance at the jobsite or in any vehicle or equipment used in performance of the Work.
General Conditions and Standard Specifications GC Section 5.4: The Contractor shall provide, erect, or maintain temporary fences, plates, over-crossings, trench bridges, bridges, railings, barriers, and traffic control devices, lights, warning signals, guards, street sweeping, trash removal, vector control and other security devices and systems appropriate to assure public health and safety.

General Conditions and Standard Specifications Section 01560 - Temporary Controls (1.07): Minimize fire danger in the vicinity of and adjacent to the construction site. Provide labor and equipment to protect the surrounding private property from fire damage resulting from construction operations.

General Conditions and Standard Specifications Section 01560 - Temporary Controls (1.08): Provide temporary fencing of all open or partially open trenches and excavations, all open or partially completed structures, and all work and storage areas at all times while unattended by workmen.

General Conditions and Standard Specifications Section 01560 - Temporary Controls (1.09): Establish a regular daily collection of all sanitary and organic wastes. Dispose of away from the site all wastes and refuse from sanitary facilities provided by the Contractor or organic material wastes from any other source related to the Contractor’s operations in accordance with all laws and regulations pertaining thereto.

General Conditions and Standard Specifications Section 02229 - Blasting: This section describes the methods, limitations, and reporting requirements for the use of explosives and blasting conducted during excavation and tunneling operations. Submittals required include a two-part conceptual blasting plan prior to the start of drilling. Part 1, the General Plan is required to include a complete summary of proposed methods for transporting, handling, storage, and use of explosives. Requirements of Part 2, the Site Specific Plan, include: The Site Specific Plan shall include the proposed general concept for trench excavation blasting, including controlled blasting techniques and control and monitoring of fly rock, airblast and ground vibration. Blasting intensities shall be limited as required to prevent damage to all existing structures, and in no case, shall intensities exceed the safety standard of particle velocity recommended by the U.S. Bureau of Mines [RI 8507].

General Conditions and Standard Specifications Section 02229 - Blasting (1.05): Retain the services of a qualified blasting consultant specialist to assist in the preparation of the required blasting plans and verification of reports.

General Conditions and Standard Specifications Section 02229 - Blasting (3.01): Conform to the requirements specified in the State of California Construction Safety Orders for the transporting, handling, storage, and use of explosives. Transportation of explosives shall be in accordance with the regulations of the State Fire Marshall and the California Highway Patrol. The locations, access and construction of explosive storage magazines shall be in accordance with the American Table of Distances for Storage of Explosives and approved by the Chief of San Diego County Fire Department and the Sheriff of San Diego County. Blasting shall only be permitted between the hours of 8:00 a.m. and 4:00 p.m. during any weekday (Monday through Friday),
unless special circumstances warrant another time or day, and special approval is granted in writing by the Engineer and the agency having jurisdiction. Note: special allowance for possible blasting between the hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday will be requested for the proposed project.

**General Conditions and Standard Specifications** Section 02229 - Blasting (3.02): No blasting shall be permitted until the Contractor receives notification in writing from the Engineer that the blasting plans have been reviewed and until all preblast inspections and reports have been completed. Provide a minimum of two working days advance notice to all residences or businesses within 400 feet of the blast area. Provide two-work days notice to all utility agencies whose facilities may be influenced by the blasting operation.

**General Conditions and Standard Specifications** Section 02229 - Blasting (3.03): Conduct preblast inspections of all residential, commercial, and Water Authority structures, and other improvements and facilities as necessary, within 400 feet of the blast area. The preblast inspection shall be for the purpose of determining the existence any visible or reasonably recognizable pre-existing defects or damages in any structure and for quality control and construction record purposes. Conduct post-blast inspections upon receipt of a written or verbal request or complaint of damage to property, structure, or other improvement from the respective owners.

**General Conditions and Standard Specifications** Section 02229 - Blasting (3.04): Fly rock shall be contained within the project rights of way and shall not represent a hazard to people, vehicles, existing improvements or vegetation. Use blasting mats to prevent possible flyrock damage. At the end of each working day, clean the blasting site of all debris associated with the blasting operation.

**Project Design Features**

Prior to authorization to proceed or issuance of permits, the Water Authority will prepare a Fire Prevention and Response Plan. All construction crewmembers will be trained in the requirements of the plan. The plan will outline the responsibilities for the prevention, pre-suppression, and suppression activities associated with fire within MTRP.

Fire safety information will be disseminated to construction crews during regular safety meetings. Fire management techniques will be applied during project construction and deemed necessary by the Water Authority and depending on the on-site vegetation and vegetation of surrounding areas.

The Contractor will be required to conduct ongoing worker training for all levels of construction personnel, including weekly safety meetings.
2.6.10 Utilities and Public Services

**Standard Specifications**

*General Conditions and Standard Specifications* Section 01530 - Protection of Existing Facilities

(1.05): Do not operate vehicles or equipment and do not place, push, store or stockpile vehicles, equipment, supplies, tools, fabricated or manufactured articles, fuel supplies, field office facilities, excavated or imported materials of any kind, and do not perform any work within 15 feet of the centerline of existing Water Authority-owned pipelines, except where specified or shown on the Plans, or where permission is granted in writing by the Engineer. At designated crossing locations of existing Water Authority-owned pipelines, limit equipment loads to the live load limits shown or specified. At these locations, if the Contractor elects to cross existing Water Authority-owned pipelines with equipment loads in excess of the live load limits shown or specified, erect temporary bridges for use by equipment that exceeds the specified live load limits.

*General Conditions and Standard Specifications* Section 01530 - Protection of Existing Facilities

(1.08): All utilities including oil and gasoline pipelines, power, and telephone or communication cable ducts, gas and water mains, irrigation lines, sewer lines, storm drain lines, poles, and overhead power and communication wires and cables encountered along the line of the work shall remain continuously in service during all operations under the Contract, unless other arrangements satisfactory to the Engineer are made with the owner of said utility.

**Project Design Features**

The Water Authority will notify and coordinate with all other utility providers with easements, rights-of-way, or facilities within or adjacent to the area affected by the proposed project. Any need to connect with or relocate utilities will be presented to the appropriate utility provider prior to commencement of construction.

Any work requiring the shutdown of an aqueduct will be limited to a period not to exceed 10 days.

The proposed project will require connection of the pipeline tunnel to the existing aqueducts at the North and South Portals. A pipeline interconnect reconfiguration may also be needed north of the North Portal. The connections and reconfigurations will all be completed during a 10-day shutdown of the raw water aqueducts.

**2.7 DISCRETIONARY ACTIONS AND APPROVALS**

The Water Authority is the Lead Agency for the proposed project. Project construction will require the approval of the Water Authority Board of Directors. Responsible and Trustee Agencies that may take actions approving the proposed project are presented in Table 2-3.
Table 2-3
Potential Discretionary Actions and Approvals

<table>
<thead>
<tr>
<th>Agency</th>
<th>Permit/Approval</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Fish and Wildlife Service</td>
<td>Formal Section 7 Consultation for Endangered Species</td>
</tr>
<tr>
<td>U.S. Army Corps of Engineers</td>
<td>Individual 404 Permit for Crossing of San Diego River; Impacts to Other Waters of the U.S.</td>
</tr>
<tr>
<td>San Diego Regional Water Quality Control Board</td>
<td>401 Water Quality Certification or Waiver (in association with the 404 permit); NPDES Permit; Waste Discharge Permit for impacts to vernal pools; Compliance with General Permit for dewatering</td>
</tr>
<tr>
<td>California Department of Fish and Game</td>
<td>1602 Streambed Alteration Agreement; ESA Permit</td>
</tr>
<tr>
<td>City of San Diego</td>
<td>Land Acquisition; Encroachment Permits</td>
</tr>
<tr>
<td>San Diego Unified School District</td>
<td>Land Acquisition</td>
</tr>
<tr>
<td>San Diego Gas &amp; Electric</td>
<td>Encroachment Permit</td>
</tr>
</tbody>
</table>
Project Site

Basemap Legend
- Freeways
- Rivers
- Lake/Reservoir/Lagoon

Mission Trails Flow Regulatory Structure II, Pipeline Tunnel, and Vent Demolition Project

Project Vicinity

Figure 2-1
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Mission Trails Flow Regulatory Structure II, Pipeline Tunnel, and Vent Demolition Project

USGS 7.5 Minute La Mesa Quadrangle

Project Location

Figure 2-2
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Legend

- Yellow: Project Study Area

Map Notes

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Date: Mar 03, 2006

Mission Trails Flow
Regulatory Structure II, Pipeline Tunnel, and Vent Demolition Project

Project Study Area Figure 2-3
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Mission Trails Flow Regulatory Structure II, Pipeline Tunnel, and Vent Demolition Project

Map Notes:
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Date: Mar 03, 2006

Legend
- Project Features
- Tunnel Alignment
  - Elliott Vents
  - Blow Off
- Proposed Ingress/Egress Routes
- Access Staging Areas

Project Components

Figure 2-4
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Stabilized River Crossing

Map Notes

Mission Trails Flow
Regulatory Structure II,
Pipeline Tunnel, and
Vent Demolition Project

Approximate location of
the active channel of
the San Diego River

Proposed improved
crossing location
(50 ft by 100 ft temporary work area
with
15 ft by 70 ft permanent
improved crossing)
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Figure 2-9

Visual Representation of Stabilized San Diego River Crossing

Mission Trails Flow
Regulatory Structure II,
Pipeline Tunnel, and
Vent Demolition Project

Map Notes
Figure 2-10

Mission Trails Flow Regulatory Structure II, Pipeline Tunnel, and Vent Demolition Project

Map Notes

Proposed Construction Access/Haul Routes
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